Product Service System Challenges within Telecommunication: Reaching the Era of Mutual Dependency

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Abstract
Telecommunication companies are in a state of transition, going from product focus towards more service focused business approaches, and the development has been ongoing for many years. This paper takes a Product Service Systems perspective on the product-to-service transition process in the telecommunication industry by presenting the case of Ericsson. It is argued that a Product Service System approach would support the co-existence of both products and services, their mutual dependency on each other and thus gain competitive advantages for the company. Further, an Organisational Maturity and Offering Matrix is presented and the Ericsson case is mapped to it.

Keywords:
Product Service System (PSS), servicization, telecommunication, dependency, offering

1 INTRODUCTION

Today, many traditional technology intensive companies are undergoing a transition from a product centric view towards a more service centric view, especially within ICT (Information and Communication Technology) and telecommunication industry. Large international companies like IBM, HP, and Cisco move towards the service industry, offering not only products but products bundled with services and standalone services too. In telecommunications especially in the area of networks the market shares are concentrated to a few actors, e.g. Ericsson, Nokia Siemens Networks, Alcatel-Lucent etc, all having business offerings with a large share of services. However, the transition from products to services is not a straightforward journey; it takes time, and the strategies on how to accomplish the transition varies from company to company.

This paper examines the product-to-service transition process in the telecommunication industry from an organisational maturity and offering perspective. By presenting the case of Ericsson, a Swedish telecommunication company founded in 1876, how Ericsson has transferred from a product centric company towards a more service centric company, what challenges they have confronted, and what decisions have been taken, the basis for a maturity – offering model is shaped.

Today Ericsson is a telecommunication company in transition, a journey which has not been straightforward or easy, and is still not completed. The journey that the services organization within Ericsson (Ericsson Global Services) has taken towards currently generating approximately 40% of the revenue, has taken over 10 years. Much effort has been put in to combine all services units spread across business divisions amongst the technologies supported.

During this work it has become obvious that the processes, methods, and tools, traditionally used during product development within the company, are not sufficient for efficient service development. This has put pressure on the organization to change; an organization with a strong engineering identity and far reaching legacy. Thus, the main challenge to overcome during the transition from goods centric view towards a more service centric view has been people based, and still is. Convincing those with an entrenched product centric view of the reason services exists, and that it is the right time to grant some independence to the services part of the business, has been the hardest task.

First, an overview of the PSS theory base is presented; second the methodology used in the research; the Ericsson case is described in terms of the journey from a goods centric company towards a more service centric company; this is followed by a discussion on how to reach mutual dependency and the struggle to get equal seats at the table to be able to deliver true PSS offerings, and last conclusions and recommendations for future research is presented.

2 THE BALANCE BETWEEN PRODUCTS AND SERVICES

During the last decades companies have been struggling with commoditization of products, resulting in decreasing margins and the need for cost reductions [1].

Moreover, there are a number of emerging trends that forces technology driven companies into to a service mode of operation, but also beyond the service mode into totally new ways of thinking business. Wood et al. [2] elaborates on that in “Consumption Economics – the new rules of tech”. One such important, ongoing, trend is Cloud Computing. Cloud is moving the focus from owning hardware and software towards buying functionally or capacity on demand. The Cloud Computing hype cycle by Gartner [3] indicates that there is still much to come in terms of new functionality and technologies in upcoming years. Further, Woods et al. [2] argues that cloud is more than selling Everything-as-a-Service; it’s about shifting risk from customer to provider, going from complexity towards simplicity, changes in the actor ecosystem, and micro-transactions etc. Moreover, a growing consumption gap, the gap between a customers ability to consume features and the provided features or the gap between potential value and provided business value (see Figure 1), have an additional negative effect on technology driven companies ability to perform. Eventually these trends will force many companies to shift focus from the product side of business towards the services side of the business to stay competitive.

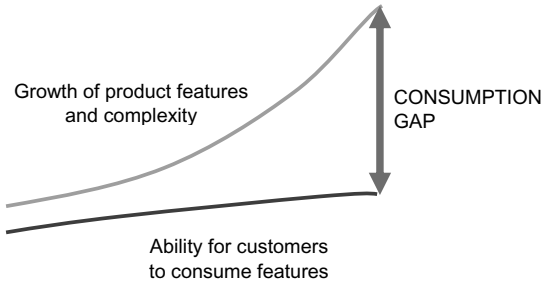

Figure 1: The Consumption Gap as explained by Wood et al. [2]

This transition, going from a goods-to-service paradigm, has been on the research agenda in academia for quite a while and is still accelerating [4]. There are several parallel approaches to this paradigm [4], however, two popular approaches that are seen in research are the concept of Service Dominant Logic (S-D Logic) originating from marketing research [5] and the concept of Product Service System (PSS) which is more or less derived from design and production research with the emphasis on environmental and sustainability issues in manufacturing industry [4].

S-D Logic has its basis in the shift of world view; from a goods-centric perspective on economics, focusing primarily on goods as the carrier of value, towards a service-centric view where value is defined by and co-created together with the consumer and network partners [5, 6]. PSS on the other hand has evolved as a parallel approach to S-D Logic, still having the basis in a goods-centric view, but extends the traditional view of a product towards a system of products and services and with a customer that pays for the use of the system rather than the buying the actual system [4]. Goedkoop et al. [7] defines a PSS as “a marketable set of products and services capable of jointly fulfilling a user’s need. The product/service ratio in this set can vary, either in terms of function fulfilment or economic value”. Based upon this definition Mont [8] argues that the traditional ways of product utilization are being replaced by a more consumer oriented way, where services to a greater extend can fulfil the consumer’s need. In this paper the PSS view will be adopted to the prevalent paradigm shift from products-to-services.

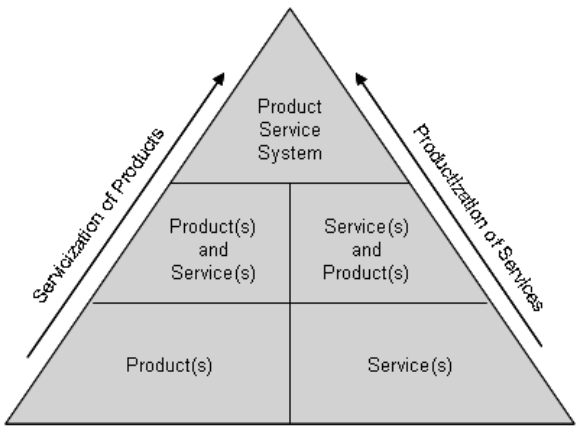

Figure 2: Product Service System (PSS) concept explained by Baines et al. [4] describing the evolution of a product or a service towards a PSS.

Not surprisingly companies encounter difficulties trying to adopt to the transformation process from a product view towards a service view, especially within the traditional manufacturing and technology intensive industries, where the product focused culture is strong and services are bundled with the products in the market offerings and with little or no emphasis on services in the early phases of product development [8-10]. In many companies the product and the services side of the organisation is likely to be separated, sometimes so detached from each other that you could talk about isolated silos, with little or no information and knowledge sharing in between.

Fundin et al. [11] argues that two different perspectives can be adapted to the goods-to-services transition, thus, identifying obstacles and barriers that the company needs to overcome in the transition process. In order to make the goods-to-services transition happen, a company’s offering needs to undergo a transformation and at the same time a transformation in the organisation needs to take place. Thus, the company needs to know where it is in the transformation process and identify where it needs to be in the future in terms of the organisation and the level of integration between products and services side, and the total offering delivered to customers.

However, findings from the manufacturing industry shows that companies that integrate product and service development fail; the service development process becomes ad hoc. While companies with separated product and service development seem to have a better position to develop services initially [11]. Fundin et al [11] also recommends, based on a multiple case study including 17 manufacturing companies, separated product and service development as a first step in the goods-to-services transition, but argues further that to build momentum in services side of business companies should integrate the product and service development. Based on Oliva and Kallenberg [9] they further present five positions that companies move along in the goods-to-service transition in terms of transforming the offering and the organisation. The different positions on the goods-to-services continuum are; (A) focusing on the core goods, (B) consolidating product-related services, (C) entering the installed base (IB) service market, (D) expanding to relationship-based or process-centred services, and (E) taking over end-users´ operation.

The lack of integration, i.e. information and knowledge sharing between organisational units during product development, is not a new phenomenon. Approaches such as Concurrent Engineering, Integrated Product Development, and Lean Product Development, all come with challenges, however emphasize the need for collaboration between actors during the product development process [12]. Combining products and services into a single offering demands close collaboration between two development processes, thus the individuals or the groups of individuals that should collaborate are confronted with several challenges [13-16]:

- How to share profit and loss
- How to cope with clashes in organisational culture and social behaviour
- How to gain trust, get commitment and share risk
- How to agree on common goals, objectives and definitions
- How to coordinate, especially on a management level
- What shared information systems to be used
- How to manage differences in expectations when it comes to technical capabilities, knowledge and skills.

Consequently, a company is confronted with a diverse number of challenges in the product-to-services transition, both organisationally and offering wise.

3 METHODOLOGY

To examine the product-to-service transition process in the telecommunication industry from an organisational maturity and offering perspective it is fundamental to understand what characterise companies that aims for a transition, why, and how the transition looks like, what challenges the companies are confronted with and their strategies to overcome them. By studying the case of Ericsson, identifying their current position in the product-to-service transition, the development of the organisational maturity and offerings over time, we aim to better understand how and why telecommunication companies pursue the transition and what they need to do to be successful in the future.

It is important to note that it is not possible to generalize from one standalone case, however, a case study over a long period of time as it is presented here is crucial to understand how and why questions. Therefore there is a need to post the how and why questions in an industry context, in this case, the context of Ericsson. Thus, the study presented in this paper aimed to identify Ericsson's current position in the product-to-service transition using Ericsson's services journey and current status as a starting point. The conceptual model presented by Fundin et al. [11] has been used to identify Ericsson's position, from an organisational and offering perspective.

Three context specific research questions have been stated during this research study:

1. How has Ericsson's product and services organisations developed over time?
2. How has Ericsson's offering portfolio developed over time?
3. How should the strategy for future product and service business look like?

Several different sources of data have been used to approach the research questions, these are; interviews with key actors on both product, services, and portfolio management side of Ericsson; documentation and archival records, e.g. material for decision-making, internal and external maturity assessments, structure analysis, process documentation; and digital physical artefacts, e.g. Ericsson Intranet, Ericsson.com, and Ericsson IT tools. The data has then been analysed by adopting a Product Service Systems perspective on the Ericsson's organisation and offering over time, and then the findings have been discussed in relation to existing theory.

4 ERICSSON AND THE SERVICES JOURNEY

Ericsson began the journey from a goods-centric company towards a more service-centric company over 10 years ago with the establishment of Business Unit Global Services. Its most recent step in the transition has been the establishment of Ericsson Global Services Research. Today Ericsson has approximately 108 000 employees and have done business in more than 180 countries world wide. More than 40 percent of the world's mobile traffic passes through Ericsson's networks.

4.1 100 years of technology focus

The original business idea that Lars Magnus Ericsson created back in 1876 was to repair telegraphy equipment. A hardware repair service (although available with different options) is still available: a hardware swap and repair service. This of course is not the only service available from Ericsson which has a broad services portfolio spanning services such as; business consulting, system integration, and managed services. However, most services have evolved over time and have been created to meet the current needs of today's telecom operators. During the last 30 years within the telecommunications industry this was marked within Ericsson with the introduction of stored program control switches (AXE family of telephony switches), using computers to control the switching of calls through telephony exchanges. The approach that Ericsson took was to make both the software and hardware modular and easily expandable. This has been an extremely successful approach, enabling advances in processing power, and component density to easily be adopted and upgraded on live switches and to introduce new functionality in software to be added in real-time. This approach also formed the basis of switches used in the cellular networks introduced around 1980 in the first generation of mobile telephony.

Services delivered during the early introduction of the AXE were normally packaged as part of the contracts to supply value in the form of the hardware and laterally in the value as defined in the features and functions of the software. Services were then considered as part of the telephony systems and were dependant on those deliveries to exist. At this time Ericsson could be defined as a truly product company. However, each technology had their own services organization responsible to ensure that the hardware and software was delivered, installed, commissioned, and supported during its lifetime. The products and the services organisations where thus not separated into different organisational units.

4.2 The services journey

The creation of the first portfolios of services (based on technology) started during the early 1990's and marked the first attempts to create services marketing material, sales material, and delivery processes to enable the sales organizations to position the services as having value in their own right (and hence a price tag of their own). These early portfolios all followed the established ways of working that had been used in design and product development for many years. The beginning of 2000 marked a radical change of departure for Ericsson when it came to services. It was the merge of all separate services organizations (and service portfolio's) which existed in the various technology organizations, with the aim to take advantages of the synergies gained when having one portfolio of services and one organization responsible for the creation of all the supporting material. The bigger macro economic picture at the time involved a number of governments selling the spectrum needed to run the next generation (3G technology) to existing and potentially new operators. In a number of countries this lead to inflated license costs as existing operators had to outbid potential new operators in order not to loose their market position. The cost of purchasing these licenses lead to a slow down in investment and a dramatic decrease in hardware and software sales for the vendors and subsequent cutback in workforce needed. This also marked the early focus on services (to replace the reduction in hardware/software sales) that could be sold independently of the sales of hardware and software, services such as optimization and managed services started to gain traction. This marked the start of creating a service business within Ericsson that was independent of the products themselves.

At the same time initiatives were taken to join the product life-cycle processes for hardware, software, and services, quite contradictive to the effort to make services independent from products. In 2004 a consolidation of the

product catalogue was made on both product and services side and resulted in a new type of offering; to sell solutions. This was in some sense a combination of products and services, but with a strong focus on the product side. Between 2004 and 2009 additional initiatives were taken to visualize the services development process in relation to the product R&D process; however the turnover amongst managers impacted continuity and made this difficult. In 2010 services portfolio management agreed with parts of the product organisation on how to work together in the R&D process.

4.3 Current position

The share of services has grown over time. In recent years company financial visibility externally of those services has grown as well and latest full year results shows a services percentage of the total business revenue coming in at 37% in 2011. As of 2012 Ericsson has separated organisational units for products and for services, with separate profit and lost responsibilities. Although, services are a vital part of Ericsson business the balance between products and services side of the business is still skewed. The organisational imbalance is also shown on the data management side of the business; where supporting tools for Product Data Management are well developed, but are lacking for Service Data Management.

Ericsson's offerings are mainly separated between offering products and offering services. Although there exist other types of offerings in the portfolio that are approaching a more integrated way of offering solutions, similar to, but not equivalent to a Product Service System. Looking into the intention of why these integrated offerings were created, it has mainly been driven from a sales perspective and not a value creation perspective. Existing services and products have been bundled into offerings to facilitate the sales process. Further, parts of the business units within Ericsson have a more integrated way of working. This seems more or less to be a consequence of the type of product offered and the need for closely bundled services to that specific product. Consequently, the integrated offerings that do exist are mainly driven from a sales perspective with a product-centric view on business.

Further, an indicator of where Ericsson is currently on from an offering perspective can be seen in how Ericsson positions them to the outside world. Taking the current published web page (www.ericsson.com) as the measure of how Ericsson want to be perceived in who the customers are and what are the offerings that Ericsson delivers, there are two main areas; 'Your Business' and 'Our Portfolio'. The first outlining both the customer segments and other third party companies that are part of the business eco-system and second, the customer segments and targeted offerings along with separate sections for products, services, and a complete portfolio from A to Z.

Comparing the two areas apart from the obvious differences between third party business and Ericsson's connection to these under 'Your Business', and products and services in 'Our Portfolio', there is a difference within the 'Telecom Operators' section in either 'Your Business' or 'Our Portfolio' which shows a mixture of end user delivered services (Mobile Broadband), operator offered services (Managed Services), and also product families (Operations and Business Support Systems).

5 DISCUSSION

Today the telecommunication industry is tough from a competitive perspective where companies need to differentiate themselves and their offerings to remain competitive. Trends such as commoditization of products [2], and now also commoditization of complexity [17], forces telecommunication companies to make a standpoint; to remain on the path of a technology driven industry or to change towards a more customer value driven business. From a technology point of view, cloud technology will further drive the need to act differently when it comes to hardware, software, and services.

Taking into account the expanding gap between the features and functions being delivered and the ability of the customers to utilize them in the telecommunication industry as well as in other industries, services organisations will be instrumental in closing that gap by being the extended arm of the sales force in identifying those delivered functions that are underutilized and educating and ultimately selling them to the customers (see Wood et al. [2]). The approach to how services and products are packaged, designed, supported, and sold is all set to be impacted in a major way. If considering today's situation in Ericsson or other product-centric companies where a product is developed to a rather advanced stage before the services organisation development team is triggered, can lead to a service organisation that is always playing catch up, and at best is built up during, or at worse after, a market has been created for the products.

Today, the services and the products organisations within Ericsson are to a large extent independent of each other with separate organisational business units, which are consequently confronted with challenges related to collaboration, e.g. separate profit and loss responsibilities, different organisational cultures, separated information system, etc. Further, the balance is somewhat skewed between the units, services does not have an equal seat at the table compared to the product side.

Ericsson mainly offers product related solutions to their customers although the services area has grown to a large extent. Relating Ericsson's current state to Baines´ et al. [4] model of evolution of a PSS, Ericsson is moving up the pyramid, from the product's side, experiencing servicization of its products, and could today be said to have Products and Services, but not yet a full developed PSS (see Organisational Maturity and Offering Matrix in Figure 3). Putting Ericsson's current state in relation to the model by Fundins´ et al. [11] would position Ericsson on the goods-to-services continuum, and can be argued to alter between positions (D) expanding to relationship-based or process-centred services, e.g. value-propositions and consulting capability, and (E) taking over end-users´ operation, e.g. managed services solutions, depending on context. However, it's evident that Ericsson has come a long way on the goods-to-service continuum, but, is it enough?

The development of Ericsson's organisational maturity and offering over time is plotted in Figure 3 – The Organisational Maturity and Offering Matrix. Before 1990 and before the main shift towards services, Ericsson's focus was consequently on products. Other technology driven companies like IBM and HP could at that time also be considered product-centric. While we do know that Ericsson's organisation at that time was dependent, services were an integrated part of the product organisation, we know little about the organisational maturity of e.g. IBM and HP, although these companies today can be considered to have made successfully transitions from products to more services.

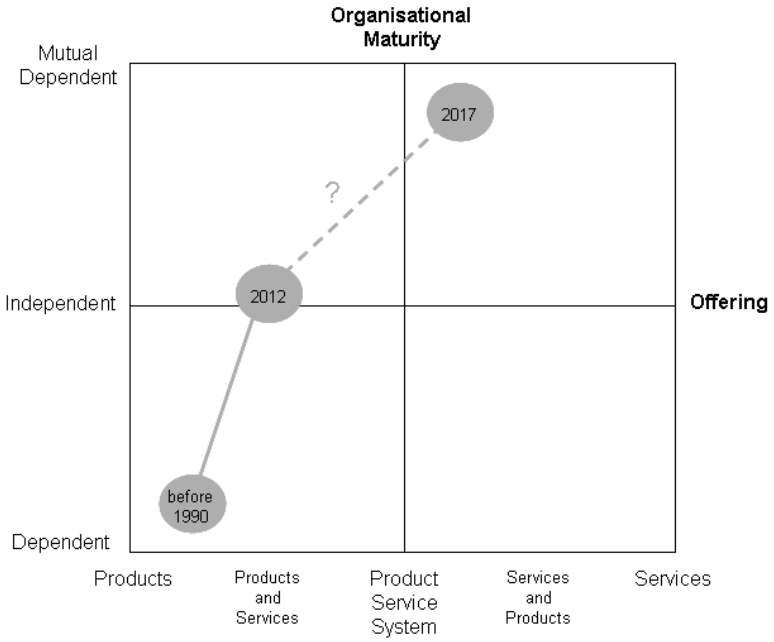

Figure 3: Organisational Maturity and Offering Matrix. The matrix describes the evolution of Ericsson's offering and organisational maturity over time and proposed direction for the future.

Ericsson cannot disregard its legacy as a technology driven company in the products-to-services transition. Being a telecommunication company having in-house design, production, and services, Ericsson will most likely not profit from a complete transition from product to services. Thus, climbing the pyramid presented by Baines et al. [4] from the 'product' side towards the top 'product service system' could be a more suitable approach than adopting the service-centric view fully. In the context of the Organisational Maturity and Offering Matrix this means that the strategy going forward should not be the upper right corner in the upper right quadrant, but going for a balance between products and services, the Product Service System, and a mutual dependent organisation.

To be able to execute such a strategy several existing challenges need to be addressed and acted upon. Still the organisational units are separated and independent of each other. Working as independent organisations on the product side and the services side has its limitations. With two organisations focusing on their top priorities many cross fertilization of ideas and improvements are lost. Further, when continuing the goods-to-service transition it is important to understand that the two view points; products and services, needs to be mutually dependant on each other and also share an equal seat around the table of business with the customers; operators in this case. This is a logical approach, however, putting into practice is harder as it depends on a radically different view of what is being designed, supported, and delivered – value.

The focus needs be on the offering itself, rather than on the organisations set up with a specific focus, this should also run through the development and operations of the products. It makes good sense that those developing the organisation have very close contact and follow-up on how the systems are performing in operation and that by merging a development organisation with an operations organisation the feedback loops are short and go directly to those responsible and more importantly can take action based on that feedback.

It is a working assumption that products are co-developed along side the services, conscious decisions can be taken as to what the product can or is possible to do with respect to the services. When applied to a telecommunications environment, many aspects of the system would benefit from these cross discipline dialogues. It also enables a more advance conversation to take place, such as how can the competence of those needed to service the product be restructured by improving the design, i.e. serviceability.

6 CONCLUSIONS

We argue that a Product Service System approach would support the co-existence of both product and service centric views and lay the foundation and platform for the change in company culture and habits that is required to reap the benefits of mutual dependency. If the two views co-existed during the development cycle, then the competitive advantage gained would be unbeatable.

Without action and adoption of a Product Service Systems approach, the ongoing technology advances and the increasing functionality in products, will not be taken advantage off and reflected in the value offered to customers. However, if fully adopted there will be a multiplier effect on the business.

To support creating a successful Product Service System and a mutual dependent organisation our supposition is that telecommunication companies have to take a more holistic view of what is being delivered, which often is a complex mixture of both products and services. When each element of this mix is viewed as equal contributors to the business, it is possible to start to position the offerings in a more competitive way and help to simplify the complexity for existing and future customers.

The services journey continues and should not stop here. The time is right to decide on the next step in how services and products are developed. However, the next step towards a transition from products to services will be just as important to take as the decision itself. Thus, there is a need for future research on the implications of the

mutual dependency services and products organisations will have on each other, the level of integration needed to succeed, and how the transition of the offering should be communicated to potential customers.

This paper has examined the product-to-service transition process in the telecommunication industry from an organisational maturity and offering perspective by studying how the telecommunication company Ericsson's organisational maturity and offerings have developed over time and why. It is concluded that a Product Service System offering together with a mutual dependent organisation would be beneficial for this type of company. The limitation is that no generalization can be made from one case only, although the data in the study is extensive and spans a long period of time. To be able to generalize it would be of interest to study other telecommunication or ICT companies too, their current position and their services journey.

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